

2MBI300VN-170-50

IGBT Modules

IGBT MODULE (V series) 1700V / 300A / 2 in one package

■ Features

- High speed switching
- Voltage drive
- Low Inductance module structure

■ Applications

- Inverter for Motor Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply
- Industrial machines, such as Welding machines

■ Maximum Ratings and Characteristics

● Absolute Maximum Ratings (at T_c=25°C unless otherwise specified)

Items		Symbols	Conditions		Maximum ratings	Units
Inverter	Collector-Emitter voltage	V _{CES}			1700	V
	Gate-Emitter voltage	V _{GES}			±20	V
	Collector current	I _C	Continuous	T _C =25°C	450	A
				T _C =100°C	300	
		I _{C pulse}	1ms	600		
		-I _C		300		
		-I _{C pulse}	1ms	600		
	Collector power dissipation	P _C	1 device		1665	W
Junction temperature		T _J			175	°C
Operating junction temperature (under switching conditions)		T _{Jop}			150	
Storage temperature		T _{stg}			-40 ~ 125	
Isolation voltage	between terminal and copper base (*1) between thermistor and others (*2)	V _{iso}	AC : 1min.		3400	VAC
Screw torque	Mounting (*3)	-			3.5	N m
	Terminals (*4)	-			4.5	

Note *1: All terminals should be connected together during the test.

Note *2: Two thermistor terminals should be connected together, other terminals should be connected together and shorted to base plate during the test.

Note *3: Recommendable Value : 2.5-3.5 Nm (M5)

Note *4: Recommendable Value : 3.5-4.5 Nm (M6)

● Electrical characteristics (at T_J= 25°C unless otherwise specified)

Items		Symbols	Conditions		Characteristics			Units
					min.	typ.	max.	
Inverter	Zero gate voltage collector current	I _{CES}	V _{GE} = 0V, V _{CE} = 1700V		-	-	3.0	mA
	Gate-Emitter leakage current	I _{GES}	V _{CE} = 0V, V _{GE} = ±20V		-	-	600	nA
	Gate-Emitter threshold voltage	V _{GE (th)}	V _{CE} = 20V, I _C = 300mA		6.0	6.5	7.0	V
	Collector-Emitter saturation voltage	V _{CE (sat)} (terminal)	V _{GE} = 15V I _C = 300A	T _J =25°C	-	2.45	2.90	V
				T _J =125°C	-	2.90	-	
				T _J =150°C	-	2.95	-	
		V _{CE (sat)} (chip)		T _J =25°C	-	2.00	2.45	
				T _J =125°C	-	2.45	-	
	Internal gate resistance	R _{G (int)}	-		-	2.5	-	Ω
	Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz		-	30	-	nF
	Turn-on time	t _{on}	V _{CC} = 900V		-	900	-	nsec
		t _r	I _C = 300A		-	400	-	
		t _{r (l)}	V _{GE} = ±15V		-	100	-	
	Turn-off time	t _{off}	R _G = 4.7Ω		-	1300	-	nsec
		t _r	L _S = 80nH		-	100	-	
Forward on voltage	V _F (terminal)	V _{GE} = 0V I _F = 300A	T _J =25°C	-	2.25	2.70	V	
			T _J =125°C	-	2.55	-		
			T _J =150°C	-	2.55	-		
	V _F (chip)		T _J =25°C	-	1.80	2.25		
			T _J =125°C	-	2.10	-		
Reverse recovery time	t _{rr}	I _F = 300A		-	250	-	nsec	
Thermistor	Resistance	R	T = 25°C		-	5000	-	Ω
	B value	B	T = 100°C		465	495	520	K
			T = 25/50°C		3305	3375	3450	

● Thermal resistance characteristics

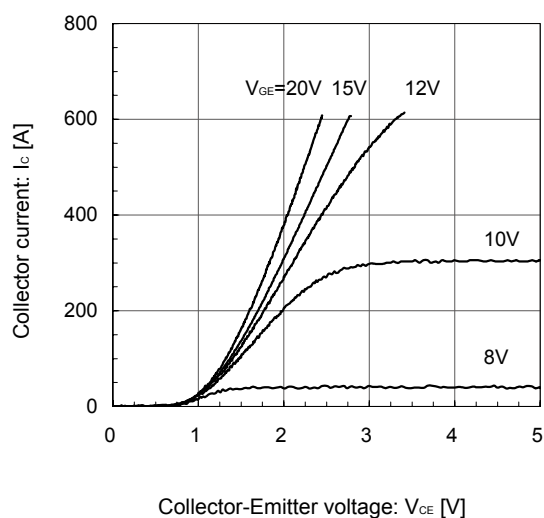
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1device)	R _{th(j-c)}	Inverter IGBT	-	-	0.09	°C/W
Contact thermal resistance (1device) (*5)	R _{th(c-f)}	Inverter FWD with Thermal Compound	-	0.0167	-	

Note *5: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

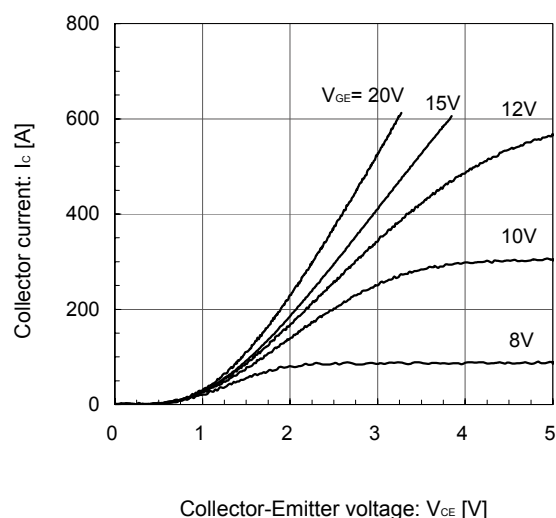
[INVERTER]

Collector current vs. Collector-Emittor voltage (typ.)
 $T_J = 25^\circ\text{C}$ / chip



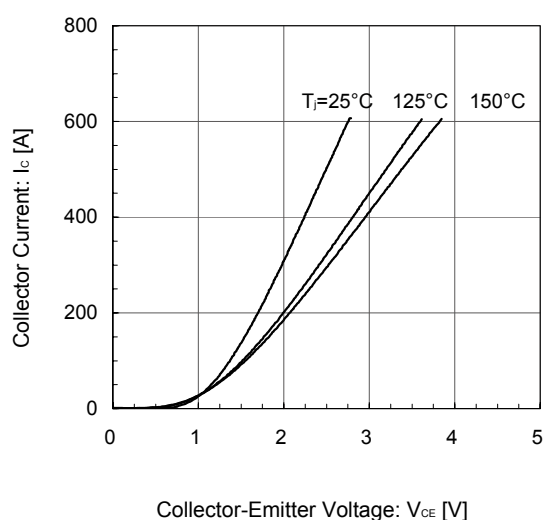
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Collector current vs. Collector-Emittor voltage (typ.)
 $T_J = 150^\circ\text{C}$ / chip



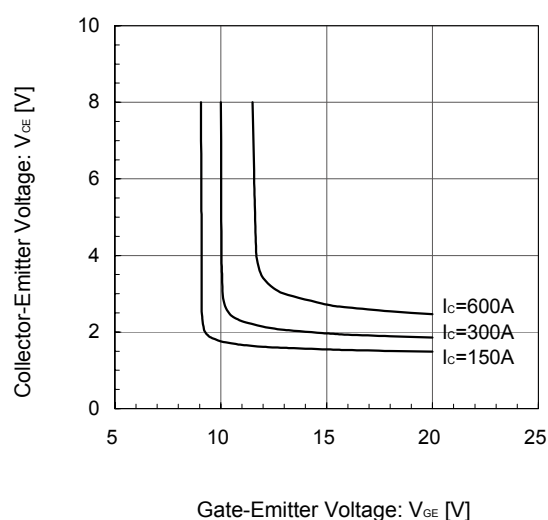
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Collector current vs. Collector-Emittor voltage (typ.)
 $V_{GE} = 15\text{V}$ / chip



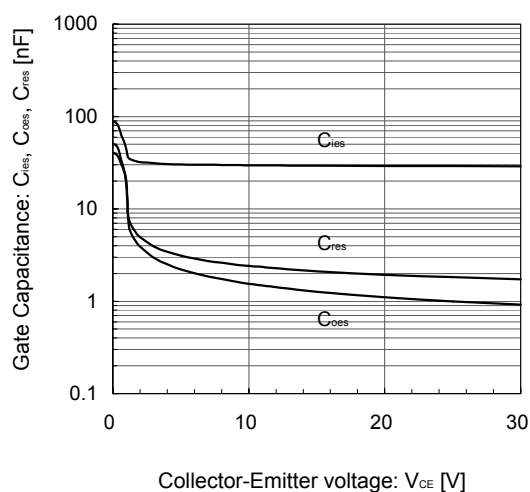
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Collector-Emittor voltage vs. Gate-Emittor voltage (typ.)
 $T_J = 25^\circ\text{C}$ / chip



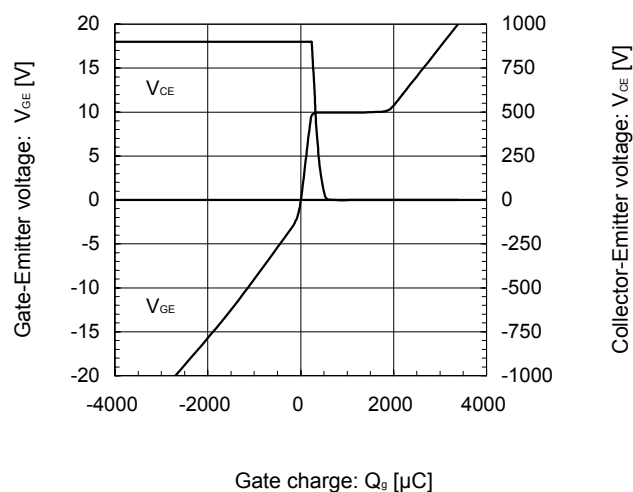
[INVERTER]

Gate Capacitance vs. Collector-Emittor Voltage (typ.)
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$



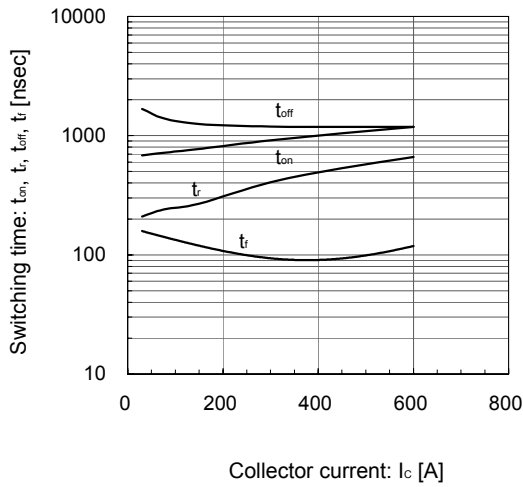
[INVERTER]

Dynamic Gate Charge (typ.)
 $V_{CC} = 900\text{V}$, $I_C = 300\text{A}$, $T_J = 25^\circ\text{C}$



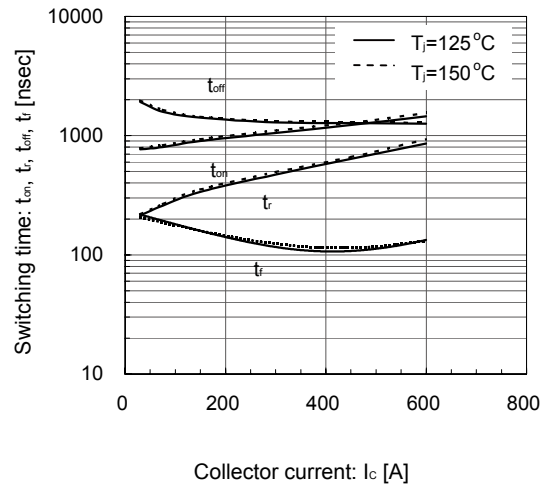
[INVERTER]

Switching time vs. Collector current (typ.)
 $V_{CC}=900V$, $V_{GE}=\pm 15V$, $R_G=4.7\Omega$, $T_J=25^\circ C$



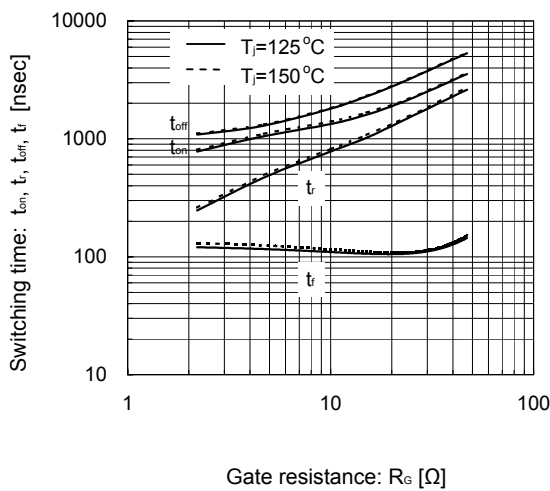
[INVERTER]

Switching time vs. Collector current (typ.)
 $V_{CC}=900V$, $V_{GE}=\pm 15V$, $R_G=4.7\Omega$, $T_J=125^\circ C$, $150^\circ C$



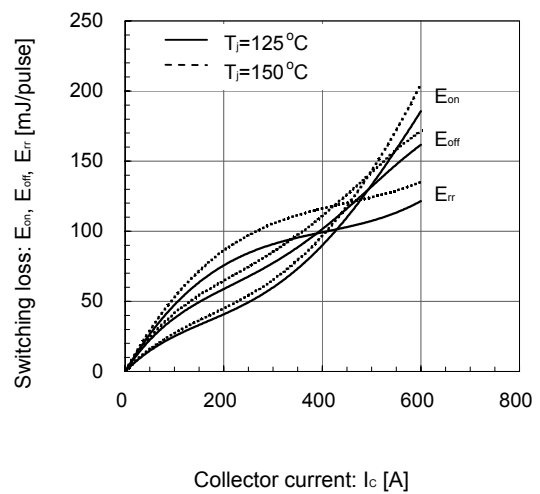
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Switching time vs. Gate resistance (typ.)
 $V_{CC}=900V$, $I_C=300A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$, $150^\circ C$



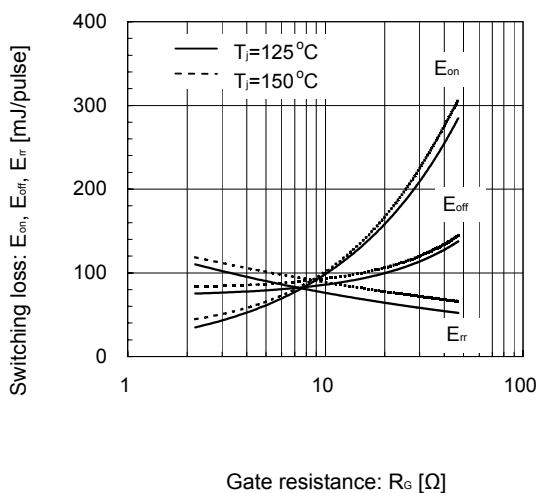
[INVERTER]

Switching loss vs. Collector current (typ.)
 $V_{CC}=900V$, $V_{GE}=\pm 15V$, $R_G=4.7\Omega$, $T_J=125^\circ C$, $150^\circ C$



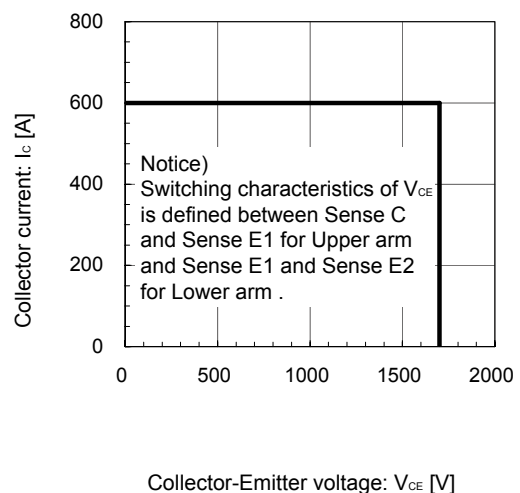
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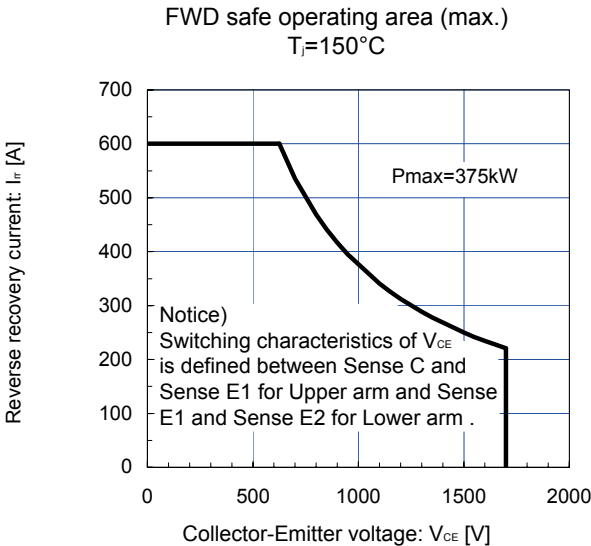
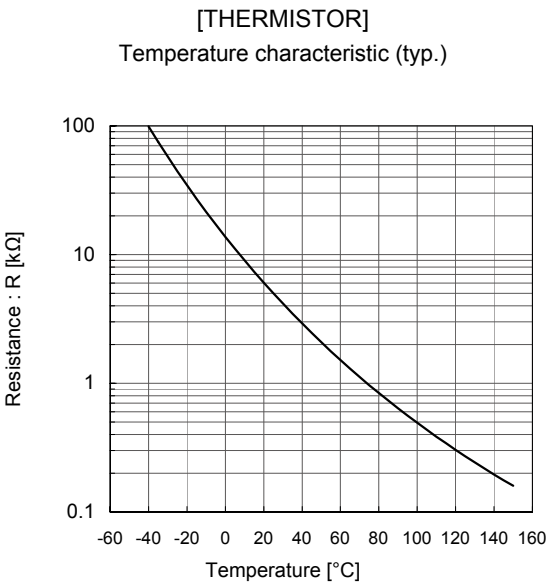
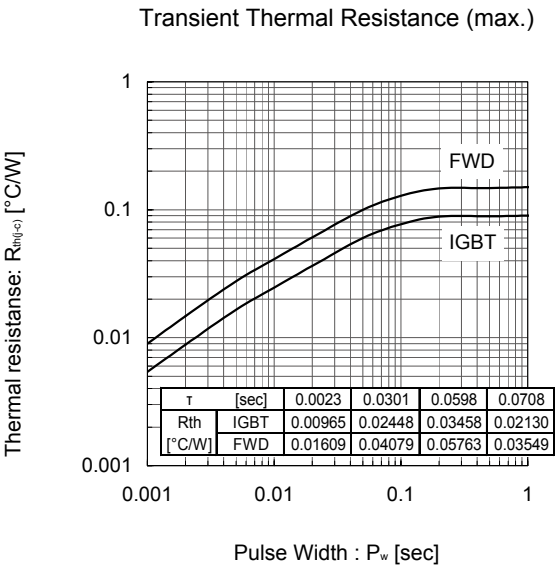
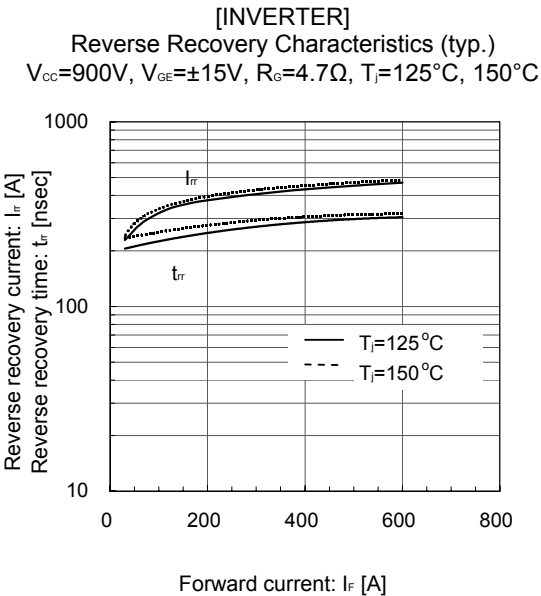
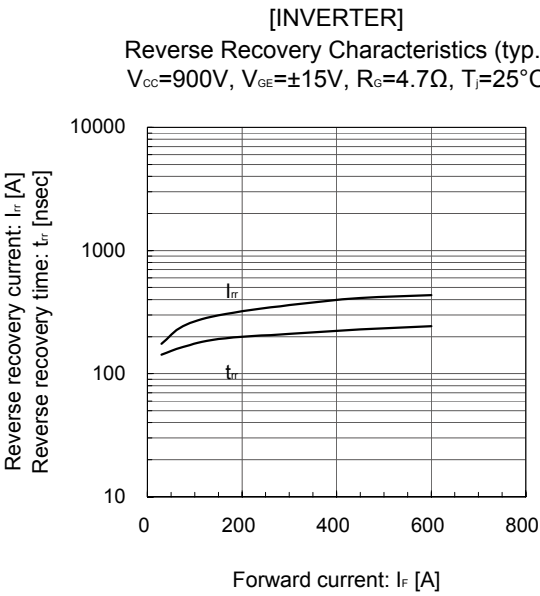
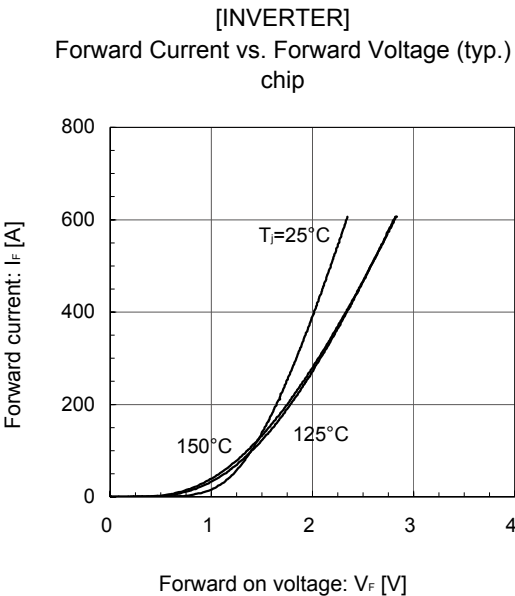
Switching loss vs. Gate resistance (typ.)
 $V_{CC}=900V$, $I_C=300A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$, $150^\circ C$



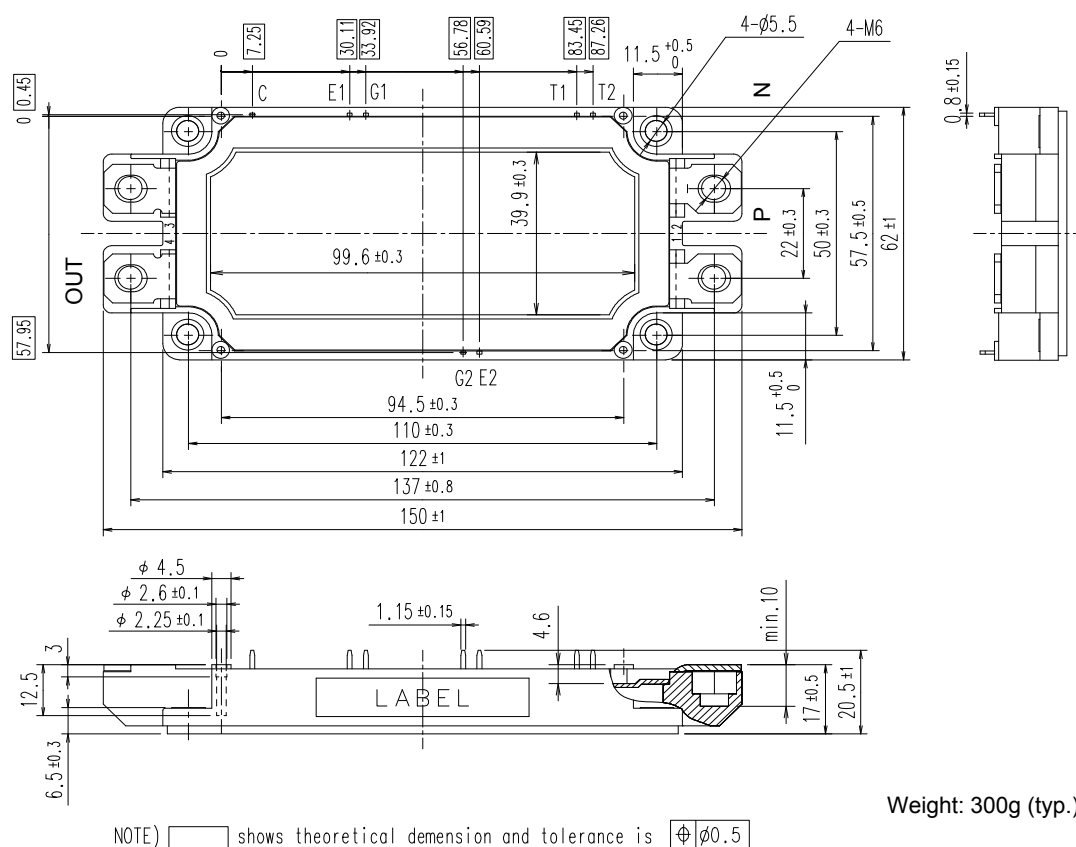
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Reverse bias safe operating area (max.)
 $+V_{GE}=15V$, $-V_{GE}=15V$, $R_G=4.7\Omega$, $T_J=150^\circ C$



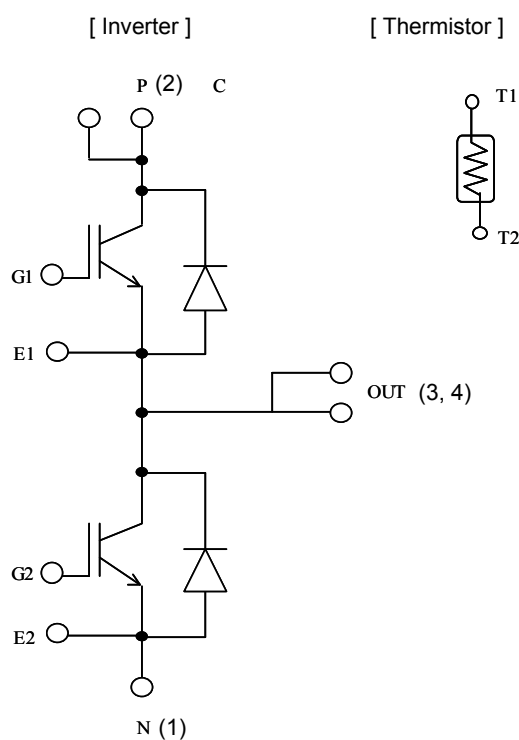


■ Outline Drawings, mm



Weight: 300g (typ.)

■ Equivalent Circuit Schematic



WARNING

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• Submarine repeater equipment		
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